Claims

1. A pharmaceutical composition comprising a *PRL-1* homologous protein or/and a functional fragment thereof, a nucleic acid molecule encoding a *PRL-1* homologous protein or/and a functional fragment thereof or/and a modulator/effector of said nucleic acid molecule or/and protein together with pharmaceutically acceptable carriers, diluents or/and additives.

2. The composition of claim 1, wherein the nucleic acid molecule is a vertebrate or insect *PRL-1* nucleic acid, particularly encoding the human *PRL-1* homologs (such as human Prl-1, Prl-2, or Prl-3 protein), and/or a nucleic molecule which is complementary thereto or a functional fragment thereof or a variant thereof.

3. The composition of claim 1 or 2, wherein said nucleic acid molecule is selected from the group of
   (a) a nucleic acid molecule encoding a polypeptide as shown in Table 2 or/and an isoform, fragment, or/and variant of said polypeptide;
   (b) a nucleic acid molecule which comprised or is the nucleic acid molecule as shown in Table 2;
   (c) a nucleotide sequence which hybridizes at 50°C in a solution containing 1 x SSC and 0.1% SDS to a sequence of (a) or (b),
   (d) a nucleic acid molecule being degenerated as a result of the genetic code to the nucleic acid sequence as defined in (a), (b) or (c);
   (e) a nucleic acid molecule that encodes a polypeptide which is at least 85%, preferably at least 90%, more preferably at least 95%, more preferably at least 98% and up to 99,6% identical to the human *PRL-1* homologous protein, preferably as described in Table 2 or as defined in claim 2 or to a polypeptide as defined in (a);
   (f) a nucleic acid molecule that differs from the nucleic acid molecule of (a) to (e) by mutation and wherein said mutation causes an alteration, deletion, duplication or premature stop in the encoded

polypeptide; and

(g) a partial sequence of any of the nucleotide sequences of (a) to (e) having a length of 15-25 bases, preferably 25-35 bases, more preferably 35-50 bases and most preferably at least 50 bases.

4. The composition of any one of claims 1-3, wherein the nucleic acid molecule is a DNA molecule, particularly a cDNA or a genomic DNA.

5. The composition of any one of claims 1-4, wherein said nucleic acid encodes a polypeptide contributing to regulating the energy homeostasis and/or the metabolism of triglycerides.

6. The composition of any one of claims 1-5, wherein said nucleic acid molecule is a recombinant nucleic acid molecule.

7. The composition of any one of claims 1-6, wherein the nucleic acid molecule is a vector, particularly an expression vector.

8. The composition of any one of claims 1-5, wherein the polypeptide is a recombinant polypeptide.

9. The composition of claim 8, wherein said recombinant polypeptide is a fusion polypeptide.

10. The composition of any one of claims 1-7, wherein said nucleic acid molecule is selected from hybridization probes, primers and anti-sense oligonucleotides.

11. The composition of any one of claims 1-10 which is a diagnostic composition.

12. The composition of any one of claims 1-10 which is a therapeutic composition.

13. The composition of any one of claims 1-12 for the manufacture of an agent for detecting or/and verifying, for the treatment, alleviation and/or

prevention of metabolic diseases or dysfunctions, including metabolic syndrome, obesity or/and diabetes, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis, in cells, cell masses, organs and/or subjects.

14. The composition of any one of claims 1-13 for application in vivo.

15. The composition of any one of claims 1-13 for application in vitro.

16. Use of a nucleic acid molecule encoding a *PRL-1* homologous protein or an isoform, a functional fragment or variant thereof, in particular a nucleic acid molecule as described in Table 2, particularly of a nucleic acid molecule according to claim 3 (a), (b), or (c), or/and a polypeptide encoded thereby or/and a functional fragment or/and a variant of said nucleic acid molecule or said polypeptide or/and a modulator/effector of said nucleic acid molecule or polypeptide for the manufacture of a medicament for the treatment of obesity, diabetes, or/and metabolic syndrome for controlling the function of a gene or/and a gene product which is influenced or/and modified by a *PRL-1* homologous polypeptide.

17. Use of the nucleic acid molecule encoding a *PRL-1* homologous protein or an isoform, a functional fragment or variant thereof, in particular a nucleic acid molecule as described in Table 2, particularly of a nucleic acid molecule according to claim 3 (a), (b), or (c), or/and a polypeptide encoded thereby or/and a functional fragment or/and a variant of said nucleic acid molecule or said polypeptide or/and a modulator/effector of said nucleic acid molecule or said polypeptide for identifying substances capable of interacting with a *PRL-1* homologous polypeptide, particularly with a polypeptide according to claim 3.

18. A non-human transgenic animal exhibiting a modified expression of a *PRL-1* homologous polypeptide, particularly of a polypeptide according to claim 3.

19. The animal of claim 18, wherein the expression of the *PRL-1* homologous polypeptide, particularly of a polypeptide according to claim 3, is increased and/or reduced.

20. A recombinant host cell exhibiting a modified expression of a *PRL-1* homologous polypeptide, particularly of a polypeptide according to claim 3.

21. The cell of claim 20 which is a human cell.

22. A method of identifying a (poly)peptide involved in the regulation of energy homeostasis and/or metabolism of triglycerides in a mammal comprising the steps of

(a) contacting a collection of (poly)peptides with a *PRL-1* homologous polypeptide, particularly a polypeptide according to claim 3, or a functional fragment thereof under conditions that allow binding of said (poly)peptides;

(b) removing (poly)peptides which do not bind and

(c) identifying (poly)peptides that bind to said *PRL-1* homologous polypeptide.

23. A method of screening for an agent which modulates/effects the interaction of a *PRL-1* homologous polypeptide, particularly of a polypeptide according to claim 3, with a binding target/agent, comprising the steps of

(a) incubating a mixture comprising

(aa) a *PRL-1* homologous polypeptide, particularly a polypeptide according to claim 3, or a functional fragment thereof;

(ab) a binding target/agent of said polypeptide or functional fragment thereof; and

(ac) a candidate agent

under conditions whereby said polypeptide or functional fragment thereof specifically binds to said binding target/agent at a reference affinity;

(b) detecting the binding affinity of said polypeptide or functional fragment thereof to said binding target to determine an affinity for the agent; and

(c) determining a difference between affinity for the agent and the reference affinity.

24. A method of screening for an agent, which modulates/effects the activity of a *PRL-1* homologous polypeptide, particularly of a polypeptide according to claim 3, comprising the steps of

(a) incubating a mixture comprising

(aa) said polypeptide or a functional fragment thereof, and

(ab) a candidate agent

under conditions whereby said polypeptide or fragment thereof has a reference activity;

(b) detecting the activity of said polypeptide or functional fragment thereof to determine an activity in presence of the agent; and

(c) determining a difference between the activity in the presence of the agent and the reference activity.

25. A method of producing a composition comprising the (poly)peptide identified by the method of claim 22 or the agent identified by the method of claim 23 or 24 with a pharmaceutically acceptable carrier, diluent or/and additive.

26. The method of claim 25 wherein said composition is a pharmaceutical composition for preventing, alleviating or/and treating of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

27. Use of a (poly)peptide as identified by the method of claim 22 or of an agent as identified by the method of claim 23 or 24 for the preparation of a pharmaceutical composition for the treatment, alleviation or/and prevention of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such

as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

28. Use of a nucleic acid molecule as defined in any of claims 1-6 or 10 for the preparation of a medicament for the treatment, alleviation or/and prevention of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

29. Use of a polypeptide as defined in any one of claims 1 to 6, 8 or 9 for the preparation of a medicament for the treatment, alleviation or/and prevention of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

30. Use of a vector as defined in claim 7 for the preparation of a medicament for the treatment, alleviation or/and prevention of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

31. Use of a host cell as defined in claim 20 or 21 for the preparation of a medicament for the treatment, alleviation or/and prevention of metabolic diseases or dysfunctions, including obesity, diabetes, or/and metabolic syndrome, as well as related disorders such as eating disorder, cachexia, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, gallstones, or liver fibrosis.

32. Use of a *PRL-1* homologous nucleic acid molecule or/and of a functional fragment thereof for the production of a non-human transgenic animal which over- or under-expresses the *PRL-1*

homologous gene product.

33. Kit comprising at least one of

(a) a *PRL-1* homolgous nucleic acid molecule or/and a functional fragment thereof;

(b) a *PRL-1* homologous amino acid molecule or/and a functional fragment or/and an isoform thereof;

(c) a vector comprising the nucleic acid of (a);

(d) a host cell comprising the nucleic acid of (a) or the vector of (c);

(e) a polypeptide encoded by the nucleic acid of (a);

(f) a fusion polypeptide encoded by the nucleic acid of (a);

(g) an antibody, an aptamer or/and another modulator/effector of the nucleic acid of (a) or the polypeptide of (b), (e), or/and (f) and

(h) an anti-sense oligonucleotide of the nucleic acid of (a).